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ABSTRACT

Ten concrete nouns represented in either a pictorial or a linguistic mode and accompanied by ten nonsense syllables were shown to 77 college students in a study of how pictorial stimuli varied in recall and recognition tasks. The group receiving pictorial stimuli recalled and recognized significantly more nonsense syllables than did the group receiving written stimuli. Regardless of mode of presentation, significantly more nonsense syllables were recognized than recalled, adding further support for the effectiveness of pictures in learning situations. (Author/RL)

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Title:

Differential memory of picture and word stimuli in a paired-associate learning task.

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Abstract:

Ten concrete nouns represented in a pictorial or a linguistic mode accompanied by ten nonsense syllables were shown to 77 university students. The group receiving pictorial stimuli recalled and recognized significantly more nonsense syllables than the group receiving written stimuli ($p < .001$). Regardless of mode of presentation, significantly more nonsense syllables were recognized than recalled ($p < .001$). Implications for education were revealed.

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Title:

Differential memory of picture and word stimuli in a paired-associate learning task.

Problem:

Traditionally, educational materials and teaching methods have been based primarily on the written word. In recent years, alternative methods have been researched. A recently explored area is the role of pictorial stimuli in recall and recognition tasks.

Numerous variables have been studied to assess and compare the effects of pictorial stimuli and written stimuli. Haber (1970) explored the potential for memory of pictures and found that recall of pictures is close to perfect. The contrast underlying the perception of pictorial and verbal stimuli was studied by Deno (1968) who used Japanese words as responses and found that pictures seemed to be much more easily associated with foreign language responses than words. In a study conducted with fifth graders (Felcher and Kutikoff, 1979), findings indicated significantly more detail was recalled when using pictorial stimuli than when using written stimuli. Other researchers (Paivio and Yarmey, 1966; Postman, 1978; Jenkins et al, 1967; Odom and Nesbitt, 1974) using paired-associate learning tasks found that pictures facilitate learning of material.

The present study examined the hypothesis that if written nonsense syllables are paired with pictures of common objects

there will be a significant difference in the number of nonsense syllables recognized and recalled than if the nonsense syllables are paired with written labels for the object. Retention was measured by responses given to written memory tasks on repeated trials in order to avoid inhibition aroused by response verbalization (Deno, 1968).

In this study only conceptually dissimilar common objects were used for stimuli, as earlier research (Deno, 1968) was confounded by the use of similar object stimuli. This study further differs from previous research in that it employs nonsense syllables paired with linguistic or pictorial stimuli.

Subjects:

The sample of 77 Pace University undergraduate students consisted of both male and female participants. The median age was 31.

Procedure:

Ten concrete nouns represented in a pictorial or a linguistic mode accompanied by ten nonsense syllables, created by the experimenters, were shown on a slide projector. The linguistic mode consisted of the pairing of an English word with a three letter nonsense syllable beneath it. The pictorial mode consisted of the same nonsense syllables with a picture depicting the same noun represented linguistically. The participants within each mode were randomly subdivided into one of two memory task

conditions (recognition or recall), thereby creating four conditions as follows: Picture-Nonsense syllable (P-N) recognition group, P-N recall group, and English Word-nonsense syllable (W-N) recognition group, and W-N recall group.

The participants in the Picture-Nonsense syllable (P-N) group were told that they would be shown pictures with three letter nonsense syllables beneath them. They were then told that after seeing the series once they would then see the ten pictures alone and this would be repeated for a total of three viewings. Sample slides were shown to demonstrate this. The participants were then told that after each series they would be given an answer sheet with instructions. Answer sheets were divided into two categories, those measuring recall and those measuring recognition. The memory task response sheets consisted of either a list of ten nonsense syllables numbered one through ten for the recognition condition, or were simply numbered one through ten for the recall condition, thus requiring the participant to write out the syllables from memory. The above procedure was identically replicated for the group which was shown the English word paired with a nonsense syllable (W-N).

For statistical analysis of the data, the mean of the correct number of nonsense syllables across three trials was used.

Results:

The results of this study support the present hypothesis in that when recall and recognition were combined, the group

receiving pictorial stimuli ($\bar{x}$=7.10) recalled and recognized a greater number of nonsense syllables (F=11.436;df 1/76,$p<.001$) than the group receiving written stimuli ($\bar{x}$=5.37).

For both P-N and W-N the mean of the correct number of nonsense syllables recognized was significantly higher than the mean number of nonsense syllables correctly recalled (F=15.729;df 1/76,$p<.001$).

Conclusions and Implications:

The results of this experiment suggest that pictorial stimuli enables individuals to more effectively recall and recognize material. This study, as did Deno's (1968), offers additional support for the effectiveness of pictures over the traditional word approach method generally used in the educational system. Since it is suggested that pictorial stimuli enhances memory as measured by retention, it seems that supplemental use of pictures in the instructional setting should be considered. This leads to a broad range of visual instructional aids in education. The current study also lends support to past research (Deno, 1968) which indicates that pictorial stimuli seems to be a particularly applicable supplementation to foreign language study because pictorial stimuli may improve teaching effectiveness by reducing student's need to refer back to their native tongue. Other specific implications of this study include other areas of education where students may benefit from a pictorial approach to unfamiliar terminology. For example, the vocabulary needed for

initial understanding of computer terminology, medical technology, engineering terminology and advanced instrumentation could be taught with this method.

Ramifications of this research may have relevance outside the formal educational setting. For example, pictorial representation may provide an important tool effective in such areas as providing warnings by labeling dangerous medications, household products, etc. with an expanded emphasis on pictures. Vivid pictorial representations associated with such social issues as alcohol and drug abuse may inhibit their misuse.

This research may lend a bit of scientific evidence to the proverb "a picture is worth a thousand words". As a suggestion for enlarging the present study researchers might consider communicating action words as opposed to object words, as well as phrases and abstract ideas via pictures.

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